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CURRENT LITERATURE.

BOOK REVIEWS.

The life history of *Pinus*.

DR. FERGUSON'S detailed account of this subject, profusely illustrated with excellent figures, will be useful as a reference work.¹ Much of the text and many of the figures have been taken from her previous papers, but the investigations have been pushed farther in every direction, so that the repetition adds to the value of the present account. The work deals primarily with *Pinus Strobus*, but conclusions are in most cases supported by observations upon several other species.

The titles of the five chapters are: microsporogenesis, the male gametophyte, macrosporogenesis, the female gametophyte, fertilization and related phenomena. In the appendix, several abnormal conditions are described.

In most species the archesporium is well developed before the approach of winter, but the mother-cell stage is not reached until the following April; in *P. Strobus* the archesporium does not appear until May. Probably there is a qualitative reduction of chromatin during the second mitosis in the pollen mother-cell. The air sacs arise by the separation of the exine from the intine at two definite points. A partial wall, lying within the intine at the prothallial end of the spore, is an interesting feature not hitherto described. The body cell ("generative cell") is not surrounded by a definite wall, and when its nucleus divides the two sperm nuclei lie free in a common mass of cytoplasm, never organizing distinct sperm cells. The two sperm nuclei are unequal in size and the larger one is always in advance.

The endosperm contains about two thousand free nuclei before walls begin to be formed. The archegonia appear about two weeks before fertilization. The independence of the male and female chromatin during fertilization, described by Miss FERGUSON and previous investigators, is here worked out in great detail. No cell walls are laid down at the base of the oosphere until the eight-nucleate stage of the proembryo has been reached. The divisions which result in the formation of four tiers of cells in the proembryo are described as taking place in the upper nuclei, which lie in the cytoplasm of the main body of the egg.

Miss FERGUSON'S conclusions are based upon an adequate field study and upon the examination of an immense number of preparations, so that the danger

¹ FERGUSON, MARGARET C., Contributions to the life history of *Pinus*, with special reference to sporogenesis, the development of the gametophytes, and fertilization. Proc. Wash. Acad. Sci. 6:1-202. pls. 1-24. 1904.

of describing an occasional condition as a typical one has been reduced to a minimum.

It is due to Miss FERGUSON to announce that the manuscript left her hands Dec. 29, 1902, after which only a few minor corrections in the latter part of the work were possible.—C. J. CHAMBERLAIN.

MINOR NOTICES.

THE FIRST PART of the second supplement (1896-1900) of the Kew Index, containing the letters A-L, is ready for distribution. It is printed uniformly in all respects with the *Index Kewensis* itself. The advantage of having such a record of the years 1896-1900 cannot be overstated, and the tremendous amount of labor it involves on the part of Sir W. T. THISELTON-DYER and his colleagues deserves recognition from botanists. The American Branch of the Clarendon Press is at 91-93 Fifth Avenue, New York City; and the price of the part is 13s.—J. M. C.

KOORDERS and VALETON² have published another fascicle of additions to the known arboreal flora of Java. The five families included are Fagaceae (*Castanea* 3 spp., *Quercus* 25 spp.), Lauraceae (71 spp., 10 of which are new), Monimiaceae (4 spp.), Coniferales (*Podocarpus* 5 spp., one new), and Casuarinaceae (2 spp.).—J. M. C.

NOTES FOR STUDENTS.

INSECTS AND FLOWER COLORS.—Before considering some very recent papers on this subject, brief reference may be made to the work of PLATEAU, who more than any other investigator, has raised objections to the familiar "flag" or "signal" theory, as held by SPRENGEL, MUELLER, and DARWIN. Among the more striking of PLATEAU'S observations,³ we may note that he observed insect visits in normal number to heads of *Dahlia*, which were variously hidden from vision by means of leaves and papers; that the removal of the corolla from *Lobelia* flowers did not affect the insect visits, as claimed by DARWIN; that insects visit indifferently flowers of *Salvia* and *Zinnia*, similar in species but differing in color; that *Pelargonium*, however showy the flowers, is but little visited by insects normally, but that visits are readily induced in great numbers, if honey is placed on the flowers; that visits to *Dahlia* flowers cease if the nectar glands are removed, but begin again if honey is added; that the removal of the outer radiant flowers of *Hydrangea* has no effect on insect visits; that even such intelligent insects as bees commit many errors, visiting buds, wilted flowers, fruits, etc. In general

²KOORDERS, S. H., and VALETON, TH., *Boomssoorten op Java*. Bijdrage no. 10. Mededeel. 'sLands Plant. no. 68. pp. vi+287. Batavia. 1904.

³See Bull. Roy. Acad. Belg., 1895, 1896, 1897; Mém. Soc. Zool. France, 1898, 1899, 1900; Ann. Soc. Entomol. Belg. 1901, 1902; Bull. Roy. Acad. Belg. 1902. Reviews of these articles in Biol. Cent. 16:417; 17:599; 18:469; 19:349; 20:490; 21:650; 23:224; 23:311.